

Selected Definitions for Ecological Evaluation

Note – This glossary has been prepared for use in PROSPECT and other training classes.

Terms included in this version – Alternative, Approach, Assessment, Assessment procedure, Basin, Benefit, Best Professional Judgment, Classification, Cost-effectiveness analysis, Delineation, Ecosystem, Evaluation, Function, Incremental Cost Analysis, Inventory, Management measure, Method, Metric, Model, Objective, Output, Procedure, Process, Services, Significant, Structure, Technique, Value, Watershed

Alternative: a set of one or more management measures that function together to address one or more objectives. May be referred to as an alternative plan. **Example:** the combination of dam removal, bank stabilization with bioengineering techniques, and control of human access to a stream to improve native aquatic species diversity.

Approach: the strategy or conceptual framework for tackling a problem; a general way of advancing into planning analysis. Determining the approach to a problem requires selection from among competing approaches and a decision. **Example:** use GIS modeling and satellite imagery to classify land cover types, convene an expert panel to modify an assessment procedure for local application, build a conceptual model to further refine data needs.

Assessment: quantification; the act of identifying, characterizing, and measuring ecological functions. Currently most assessments in use by the Corps provide quantification on a scale from 0 to 1. **Example:** determine habitat quality for cavity-nesting birds, characterize the ability of a bottomland wetland to retain floodwaters.

Assessment procedure: tools that allow quantification; tools that provide a defined procedure for identifying, characterizing, and measuring ecological functions. **Example:** Floristic Quality Assessment (FQA), Habitat Evaluation Procedures (HEP), Hydrogeomorphic Assessment (HGM), Index of Biotic Integrity (IBI), Instream Flow Incremental Methodology (IFIM), Riverine Community Habitat Assessment and Restoration Concept (RCHARC), Wetland Rapid Assessment Procedure (WRAP).

Basin: a drainage associated with a river basin including its tributaries. There may be multiple watersheds within a basin, one for each tributary. **Example:** The Missouri River basin.

Benefit: an outcome associated with changed outputs described in terms of their relative value; the outcomes and changed outputs are a result of the Corps project or action being discussed. Benefits may be economically valued or assessed with nonmonetary measures. **Example:** diversity of stream invertebrates, improved water clarity, migratory habitat in riparian zones.

Best Professional Judgment: a descriptive approach to assessment that relies on ratings or rankings performed by individuals with knowledge of the area and system. **Example:** a team examines five alternatives and scores them from low (1) to high (5) on their ability to meet the objective.

Classification: the systematic arrangement in groups or categories according to established criteria. To classify land and water cover, we identify relationships and patterns on the landscape and draw lines around them, with the size of the pattern depending on the scale at which classification is done and the intended use of the classified results. **Example:** A variety of classification schemes have been developed for wetland plant communities including the

"Classification of Wetlands and Deepwater Habitats of the United States" and the Hydrogeomorphic classification. These classifications can then be used to determine the wetland type(s) on a particular site, or to determine the types and their extent over a large area (inventory).

Cost-effectiveness Analysis: an analysis done to find the cost-effective alternative plans. For a given level of environmental output (habitat units, acres, IBI scores, etc.), no other plan costs less. Similarly, no other plan delivers more environmental output for less cost.

Delineation: the process of marking a line on the ground (and ultimately on a map), delineating the boundary between two areas of interest, e.g., land cover classes. Also refers to the technique of identifying and determining the jurisdictional boundary of wetlands in the United States for Section 404 permit actions. **Example:** delineating wetland from upland or aquatic systems.

Ecosystem: An ecosystem is a biotic community together with its physical environment, considered as an integrated unit. Implied within this definition is the concept of a structural and functional whole unified through physical, chemical, and biological processes. **Example:** the Gulf of Mexico, Crab Orchard Lake, a stand of old growth timber. Note: An ecosystem and a watershed can be equivalent but need not be. Any one watershed may encompass multiple ecosystems, and a sufficiently large ecosystem will encompass multiple watersheds.

Evaluation: an overarching term for assessment and appraisal of alternatives. Assessment is the quantification, and appraisal is the judgment. The primary reason for evaluating plan impacts is to quantify plans for further consideration in the comparison step of the planning process. **Example:** quantification of benefits of dam removal for improving fisheries and stream biotic integrity, followed by comparison to the without-project condition, analysis of the effects of the action, analysis of how well the alternative meets the objectives, and whether the alternative is justified or not.

Function: the biological, physical, and chemical processes that occur in natural systems; which functions are occurring and the level at which they are occurring are both of interest. **Example:** fish and wildlife habitat support, carbon cycling, nutrient trapping.

Incremental cost analysis: analysis performed on the cost-effective alternative plans. We look at changes in cost and changes in output as we move to successively larger (more output) alternative plans. We look for the plans that give us the greatest increases in output for the least increases in cost (stated another way, the plans that have the lowest incremental costs per unit of output for successively larger levels of output). We call these plans that are "most efficient in production" the "best buy" plans.

Inventory: determining the extent and distribution of a unit of interest. **Example:** inventory of wetlands within a watershed, number of breeding pairs of least terns.

Management measure: a feature or activity that can be implemented to address one or more planning objectives. A measure may be structural or non-structural. Management measures are combined to produce alternative plans. **Example:** construct fish spawning substrate, introduce coarse woody debris, revegetate riparian banks.

Method: synonym for Procedure.

Metric: a unit of measure that coincides with a specific method or procedure or analysis. In Corps planning, metrics are used for assessing and comparing properties such as scale, capacity, or quantity. Metrics are used in evaluating the outputs of ecosystem restoration alternatives. **Example:** habitat units derived from Habitat Suitability Index models or functional capacity units derived from hydrogeomorphic wetland function assessment models.

Model: an abstraction or simplification of reality; a subset of the most critical components of the system being modeled. Models may be conceptual or mathematically expressed. Models are often used in evaluation to quantify outputs. **Example:** Habitat Suitability Index (HSI) model, Ecological Dynamics Simulation (EDYS), Hydrological Simulation Program – FORTRAN (HSPF), Hydrologic Engineering Center River Analysis System (HEC-RAS).

Objective: A clear statement of intended purpose; description of desired results or outputs, e.g., from ecosystem restoration. Objectives are written for specific actions, projects, or activities. **Example:** Restore the natural emergent marsh vegetation at Babylon Marsh; increase native species diversity in the Babylon River basin.

Output: the desired or anticipated measurable product or result of restoration measures and alternatives; the increase of quality and/or quantity of selected ecosystem resources. These measured outputs provide the metric for determining how well an alternative plan meets the objectives of the project, and for comparing and selecting among alternatives. Ecosystem restoration projects must be formulated for outputs that are considered significant. **Example:** diversity of native species in the Babylon River, extent of oyster beds, habitat to support viability of an endangered species.

Procedure: the steps, framework, and formulations used in assessment. These include simple formulations based on expert opinion, local rapid assessment procedures, and more rigorous assessment procedures. **Example:** Best Professional Judgment, conceptual models, Index of Biotic Integrity.

Process: physical, chemical, and biological flows of energy and material that result in the functions of ecosystems. **Example:** hydrologic cycle, carbon sequestration, predation.

Services: referring to natural services, these are beneficial outputs that result from functions of natural systems and that are valued by or valuable for society. **Example:** better fishing and hunting, cleaner water, better views, and reduced human health risks and ecological risks.

Significant: likely to have a material bearing on the decision-making process. Significance is based on institutional, technical, and / or public recognition. The scale of significance can be from local to international. Resources, effects, and outputs can be determined significant. **Example:** ecosystems such as wetlands and coral reefs, species such as the bald eagle.

Structure: the spatial and temporal occurrence and arrangement of material in an ecosystem; the physical manifestation of processes and functions. **Example:** amount and distribution of sediment, biomass, vegetation layers, or species.

Technique: manner in which field, lab, and office data are collected and analyzed. Data may be used in an Assessment Procedure. **Example:** Light trap for tadpoles, stratified random transect for ground vegetation, soil probe.

Value: (1) monetary measure of the contribution to human welfare provided by project outcomes, (2) numbers in an analysis, (3) society's or an individual's view of a thing.

Watershed: a portion of land defined based on topography and water flow. A watershed is an area of land within which all surface waters flow to a single point. An ecosystem and a watershed can be equivalent but need not be. Any one watershed may encompass multiple ecosystems, and a sufficiently large ecosystem will encompass multiple watersheds. **Example:** Chesapeake Bay watershed, which contains the Department of Army installation Fort Belvoir, which contains 7 watersheds and 53 subwatersheds.

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April 2003